SCIENCE & EDUCATION
Impact
Benefits from USDA/Land-Grant Partnership

Growing Food While Protecting Our Planet

Stewardship can save money and improve profit.

Agriculture is a sustainable cycle of taking from and replenishing the land. The USDA/Land-Grant partnership is helping American farmers till and tend the earth in ways that reduce runoff, recycle waste (and even make it smell better), improve the soil and use less fertilizer and fewer pesticides.

Payoff

- **Litter birds**. **Louisiana State** researchers have found that applying poultry litter on pastures can reduce fertilizer costs by 39 percent. In a single county, a **West Virginia** Extension program helped 80 farmers recycle 9,000 tons of poultry litter to pastures, saving up to $175,000 annually in fertilizer costs. **Arkansas** scientists are developing ways to use litter to heat poultry buildings, saving fuel costs and the cost of hauling waste to fields or landfills.

- **Recycling manure**. **Texas A&M** researchers are discovering ways to use feedlot manure to reduce nitrogen oxide emissions of coal-fired power plants. To make sure excess phosphorus doesn't build up in the soil where manure is applied, **Maryland** researchers are growing plants, including corn and Indian mustard, which absorb excess phosphorus and store it in leaves and stems.

- **Conservation tillage**. **Tennessee** Extension programs have encouraged farmers statewide to increase their no-till and conservation tillage practices. Organizers estimate these tillage changes have reduced soil erosion potential 20 million tons. Using techniques learned from **Georgia** Extension, farmers in one county switched to conservation tillage on 9,000 acres in 2002 and produced yields comparable to conventional tillage at less cost. This saved them $30 per acre, or $270,000 overall.

- **Moo-ving cows around**. Comparing rotational and conventional grazing, **Oregon State** researchers found that rotational grazing helps control weeds, prevent soil erosion and boost livestock production income $84 per acre. **Virginia Tech** scientists developed a grazing system that rotates dairy cows out of mud and onto grass. Besides preventing soil loss of 850 tons per year to erosion, the system saves 4,600 pounds of nitrogen and 920 pounds of phosphorus annually.

RESEARCH, EXTENSION AND EDUCATION AT WORK

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- **Pesticide alternatives**. One way to reduce chemical use in agriculture is to entice pests away from the cash crop and onto a perimeter "trap" crop, which the bugs like better. Then all the farmer has to do is kill the bugs on the trap crop. **Connecticut** researchers tried this with a pepper pest. The treatment left the cash crop nearly 100 percent pest-free, reducing pesticide use nearly 90 percent, while saving growers up to $153 per acre. **Kentucky State** scientists devised a mechanical means to reduce chemical use with honeybees, which are vital crop pollinators. They use screens under hives so that when varroa mites, which plague honeybees, fall through, they can't get back.

- **Reducing fungicide use**. **California** scientists created a test to detect fungal disease spores in fruit and nut crops so farmers know for sure when to spray. In the San Joaquin Valley's 400,000-acre stone fruit and nut crop, skipping just one fungicide application saves $8 million, while reducing the fungicide runoff.

- **Animal weed eaters**. Leafy spurge, an invasive noxious weed, is spreading throughout the West. It costs Oregon ranchers $13 million a year in lost income and more in ineffective herbicide treatments. **Oregon State** scientists are sending angora goats to the rescue. One hundred goats on a 150-acre ranch reduced herbicide costs by $10,000 per year. Translated statewide, this could cut herbicide costs by $1 million. Goat owners also could earn income by renting their animals and selling meat and wool. **North Dakota State** scientists found that sheep suppressed growth of this weed by more than 90 percent.

- **Breath of fresh air**. **Purdue** researchers reduced harmful hog manure odor by changing the pigs' diet. By reducing the crude protein and adding synthetic amino acids, they cut nitrogen levels in manure by up to 30 percent, reduced ammonia concentrations in the air by half and dropped detectable odors and "rotten egg" gas emissions by 40 percent. **South Dakota State** researchers developed a biofilter that hog farmers can build themselves for as little as $1,500 and reduce odor in a confinement facility by as much as 97 percent. **Michigan State** scientists are adding ozone to stored swine manure to remove odor and render it safe as fertilizer.

- **In bad taste**. Catfish farmers don't worry about smell so much as that muddy, musty taste that can develop in their product. This off-flavor, caused by algae in ponds, is difficult and costly to get rid of. **Mississippi State** researchers developed a process that can absorb up to 85 percent of the chemicals that cause off-flavor in 24 hours. This process is environmentally friendly, cost effective and will prevent nearly $60 million in lost catfish sales annually.

- **Carbon in the bank**. Understanding how to tie up carbon in crops and keep it in the ground rather than in the atmosphere could help reduce the threat of global warming, and farmers might earn extra income to boot. **Ohio State** researchers are promoting the idea of carbon "credits." Air-polluting companies could pay landowners to store carbon. At a conservative $5 to $10 per ton, the potential value of sequestered carbon is $750 million to $2 billion for U.S. cropland. **Nebraska** scientists are measuring how carbon cycles through the atmosphere, plants and soil to identify ways to store more carbon in irrigated cropland.

- **Saving water**. **Texas A&M** and **New Mexico State** researchers found that lining irrigation canals can prevent seepage of up to 7 cubic feet per second per mile. After **Utah State** researchers helped 70 large water users with water audits and irrigation scheduling, they reduced water use up to 28 percent per year. The 67 million gallons of water saved each year would fill the University of Utah's football stadium with a column of water 203 feet high at a savings of $207,146.

Cooperative State Research, Education, and Extension Service
United States Department of Agriculture

Cooperative State Research, Education, and Extension Service in cooperation with the Extension Committee on Organization and Policy, the Experiment Station Committee on Organization and Policy, the Academic Programs Committee on Organization and Policy, the International Programs Committee on Organization and Policy, and the Louisiana State University Agricultural Center.

April 2003